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THE IMPORTANCE OF MEASURING IRRIGATION WATER

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A radio talk prepared by R. L. Parshall, Senior Irrigation Engineer, Division of Irrigation, Bureau of Agricultural Engineering, and delivered by A. L. Fellows, Senior Irrigation Engineer, in the Department of Agriculture period of the Western Farm and Home Hour, Tuesday, February 16, 1932, through Station KGO and eight other stations associated with the Pacific Division, National Broadcasting Company.

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Irrigation water is a valuable commodity. The crop-yield, expressed in tons, bushels, pounds, or other convenient units, and the financial return, expressed in dollars and cents, are roughly proportional to the available water supply. Very often, however, the fair measurement and distribution of water to users, although an essential factor in the production of the crop, and therefore of the financial return, is given little or no attention. It is logical to assume that if crop-yields are to be measured correctly to determine their value, similar attention should be given to the distribution of the water that is such a vital factor in the producton of the crops.

Investigations carried on in many parts of the West show that only a relatively small part of the water thus used is accurately measured, that a larger part is metered by unreliable or unsuitable devices, and that of the still larger remainder the amounts delivered to users are merely estimated, or roughly approximated. In many cases officials responsible for the distribution of the water are obliged to operate the distributing systems very unsatisfactorily because of the mistaken ideas of governing boards with respect to what constitutes true economy. In most localities irrigation water is too valuable to permit of the use of inadequate facilities for measuring it for distribution.

This value varies greatly under different conditions. The locality, the variety of crop grown, the relative wetness or dryness of the season, the amount of water available, and other factors affect it. In other words, the value is determined in accordance with the general laws of supply and demand.

Water may be delivered to the user in terms of volume, as in acre-feet, of rate of flow, as in cubic feed per second, or a time basis, or under different combinations of these. Whatever the system, the user is entitled to his rightful share of the available supply. Obviously, guesses, estimates, and inaccurate methods of measuring are not conducive to equitable apportionment. When distribution for a number of users served from a common source of supply is made by using estimates or unsuitable measuring devices, it is generally safe to assume that those who are served first get more than their rightful amounts. Then, in cases of normal or deficient supplies, those located lower down do not receive the amounts to which they are entitled.

Last year the irrigation supply was short in many parts of the West and the value of water was relatively high. One cubic foot per second flowing for 24 hours amounts to just about 2 acre-feet. Assuming, for example, that the charge per acre-foot is \$10, an error of 1 second-foot in measuring means a difference of \$20 per day in cost. It is not at all unusual to find errors of several second-feet in distribution allowances. Obviously, when several appropriators are served from a given supply and some of them get more than they are entitled to, others must get less than their respective

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shares.

Moss, weeds, willows, and other growths, accumulations of sand, and other obstructions retard the flow of water and reduce the carrying capacity of a canal. When the discharge of a channel thus obstructed is computed by using a rating flume of the ordinary type, unless constant attention is given to the calibration of the flume, the actual discharge is usually less than is indicated by the gage-height. Failure to recognize the importance of reliable methods of measuring means a substantial financial sacrifice.

Material errors, amounting in some cases to as much as a second-foot per individual user, have been observed in studying the distribution of water. I repeat that, with water costing \$10 per acre-foot, this means a charge of \$20 too much or too little every day that this condition prevails. If a user is getting more than he pays for, his neighbor has to stand the loss; if he gets less than he pays for, he himself is the loser and others benefit through his loss. The importance of correcting such conditions cannot be too strongly emphasized.

Some officials and users have assumed an indifferent attitude and argue that it is best to "let sleeping dogs lie". Again some maintain that slipshod methods of measuring water will, in the end, result in fair averages for the season - that too much today and too little tomorrow will tend to compensation of errors. Either assumption, of course, is both poor judgment and bad business. Under such practices the amounts of the assessments or rentals do not truly reflect the actual use and enjoyment of the water. The amount of money paid for the use-privilege is fixed and definitely stated in dollars and cents, whereas the amount of water, the commodity purchased, is indefinite and questionable. It is just as essential that the user have his irrigation water measured as it is to have his grain sold by the bushel.

Farmers' Bulletin No. 1683, entitled "Measuring Water in Irrigation Channels", which has just been published by the Department goes into this subject in greater detail than I can go at this time and we shall be glad to send copies to any and all who ask for them. Please write to the station to which you are now listening.